Lake Cochrane

Site Description

Location

Water designation number (WDN)	23-0005-00
Legal description	T114N-R47W-Sec.4-5,8
County (ies)	Deuel
Location from nearest town	5.5 miles south and 2 miles west of Gary, SD

Survey Dates and Sampling Information

Dates of current survey	June 4, 2012 (EF-LMB) June 12-13, 2012 (FN, GN)
Electrofishing-LMB (min)	60
Frame net sets (n)	12
Gill net sets (n)	4

Morphometry (Figure 1)

Watershed area (acres)	833
Surface area (acres)	355
Maximum depth (ft)	24
Mean depth (ft)	13

Ownership and Public Access

Lake Cochrane is a meandered lake owned by the State of South Dakota and the fishery is managed by the SDGFP. A single public boat access site is present on the western shore of Lake Cochrane and is maintained by the SDGFP (Figure 1; Figure 2). The property surrounding Lake Cochrane is owned by the State of South Dakota and private parties.

Watershed and Land Use

The Lake Cochrane watershed is comprised of a mix of cropland (55%), pasture or grassland (23%), municipal (16%), woodland (5%), and other uses (1%). The Lake Cochrane shoreline is highly developed with lake homes and/or cabins present around nearly the entire shoreline.

Water Level Observations

The South Dakota Water Management Board established OHWM is 1684.3 fmsl, and the outlet elevation of Lake Cochrane is 1682.8 fmsl. On September 29, 2011 the elevation of Lake Cochrane was 1682.0 fmsl. The water level of Lake Cochrane had declined to elevation of 1680.4 fmsl on October 3, 2012. No Spring 2012 water elevation was available.

Fish Management Information

Primary species	Black Crappie, sunfish (Bluegill, Green Sunfish, Bluegill X Green Sunfish hybrids), Largemouth Bass, Walleye
Other species	Black Bullhead, Common Carp, Northern Pike, Shorthead Redhorse, White Sucker, Yellow Perch
Lake-specific regulations	Largemouth/Smallmouth bass: Only those <14", or 18" and longer may be taken. Of those no more than one may be 18" or longer.
Management classification	warm-water permanent
Fish consumption advisories	none

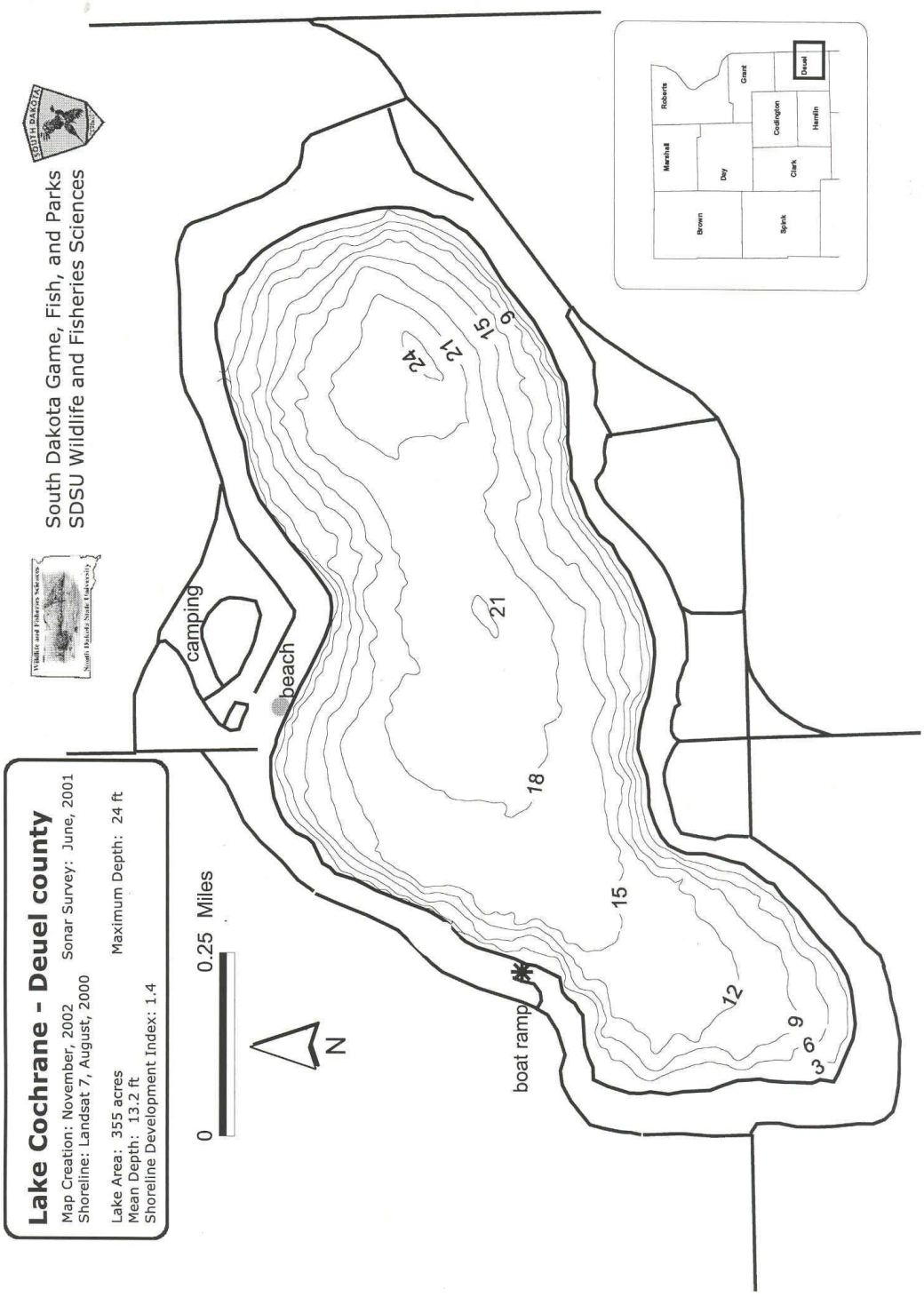

Figure 1. Contour map of Lake Cochrane, Deuel County, South Dakota.

Figure 2. Map depicting geographic location of Lake Cochrane (Deuel County) from Gary, South Dakota (top). Also noted is the public access area and standardized net locations (bottom) for Lake Cochrane. CHFN= frame net; CHGN= gill net

Management Objectives

1) Maintain a mean frame net CPUE of stock-length Black Crappie ≥ 10, a PSD of 30-60, and a PSD-P of 5-10.

2) Maintain a mean spring night electrofishing CPUE of stock-length Largemouth Bass ≥ 50, a PSD of 20-40, and a PSD-P of 0-10.

3) Maintain a mean frame net CPUE of stock-length sunfish (Lepomis spp.) ≥ 25, a PSD of 30-60, and a PSD-P of 5-10.

4) Maintain a mean gill net CPUE of stock-length Walleye ≥ 10, a PSD of 30-60, and a PSD-P of 5-10.

5) Maintain a mean gill net CPUE of stock-length Yellow Perch ≥ 30, a PSD of 30-60, and a PSD-P of 5-10.

6) Maintain a mean frame net CPUE of stock-length Black Bullhead ≤ 100.

Results and Discussion

Lake Cochrane is a relatively-small natural lake located in the eastern reaches of the Coteau des Prairie. The lake is a popular destination for various recreational activities and has one of the more developed shorelines in northeast South Dakota. Nearly the entire shoreline is surrounded by cabins and homes with the exception of state-owned lands within the state park and lake access area.

Currently, Lake Cochrane is primarily managed as a panfish [i.e., Black Crappie, sunfish (Bluegill, Green Sunfish, and sunfish hybrids), and Yellow Perch], Largemouth Bass and Walleye fishery.

Primary Species

Black Crappie: The mean frame net CPUE for stock-length Black Crappie in 2012 was 1.3 (Table 1) and was below the management objective (≥ 10 stock-length Black Crappie/net). Frame net CPUE values have been below 3.0 since 2008 indicating low relative abundance (Table 2). However, a substantial increase was observed in the mean gill net CPUE from 1.0 in 2010 to 19.0 in 2012 (Table 2). The increase of Black Crappie in the gill net sample may indicate misrepresentation of the at-large population within the frame net sample and relative abundance may be higher than indicated.

Black Crappie captured in the frame net sample ranged in TL from 20 to 22 cm (7.9 to 8.7 in.; Figure 3) likely representing a single year class. Black Crappie captured in gill net sample ranged in TL from 15 to 26 cm (5.9 to 10.2 in.) and likely represents multiple year classes. Condition was good with the mean Wr of stock-length Black Crappies captured in the frame net and gill net sample being 95 and 108, respectively (Table 1).

Largemouth Bass: In 2012, the mean spring night electrofishing CPUE of stock-length Largemouth Bass was 177.0 (Table 1) and above the minimum objective (≥ 50 stock-length largemouth bass/hr). Spring night electrofishing mean CPUE of stock-length Largemouth Bass has fluctuated from a low of 100.0 (2008) to a high of 177.0 (2012; Table 2). McKibbin (2002) estimated that there was 3,818 Largemouth Bass in Lake Cochrane at a CPUE of 109 stock-length Largemouth Bass/hour in 2000. Largemouth Bass relative abundance is considered high.

Largemouth Bass captured during spring night electrofishing during 2012 ranged in TL from 20 to 47 cm (7.9 to 18.5 in), had a PSD of 43 and a PSD-P of 14 (Table 1; Figure 4). The 2012 PSD and PSD-P were slightly above the management objective ranges (20-40, 0-10). Largemouth Bass PSD and PSD-P objectives ranges are lower for Lake Cochrane than other waters managed for Largemouth Bass in region IV. The objective is to maintain a high-density Largemouth Bass population that will provide positive impacts to the size structure of panfish in Lake Cochrane. It may be necessary to sacrifice some quality (e.g., decreased size structure) in the Largemouth Bass population to improve the sunfish population through predation. In 2012, approximately 19% of the Largemouth Bass captured during spring night electrofishing were within the 356 to 457 mm (14 to 18 in) protected-slot length, and two Largemouth Bass were captured that exceeded the 457-mm (18-inch) upper slot length.

Scales were collected from a sub-sample of Largemouth Bass from the 2012 spring night electrofishing survey. Nine consecutive year-classes (2001-2009) were present indicating consistent recruitment (Table 4).

The high density of Largemouth Bass in Lake Cochrane has resulted in slow growth. In 2012, age-4 and age-5 Largemouth Bass had mean back calculated lengths at age of 256 and 297 mm (10.0 to 11.7 in), which was well below the regional averages of 325 and 356 mm (12.8 and 14.0 in) reported in Willis et al. (2001; Table 4). Mean Wr values of Largemouth Bass captured during spring night electrofishing in 2012 ranged from 96 to 99 for all length groups sampled with the mean Wr of stock-length Largemouth Bass being 97 (Table 1). A slight increasing trend in Wr was observed as TL increased.

Sunfish: The sunfish population in Lake Cochrane is comprised of Bluegill, Green Sunfish, and Bluegill X Green Sunfish hybrids. Accurate identification of these sunfish is difficult. Therefore all Bluegill, Green Sunfish and Bluegill X Green Sunfish hybrids were pooled for analysis and will be collectively referred to as sunfish throughout this report.

The 2012 mean frame net CPUE of stock-length sunfish was 67.8 (Table 1) and above the minimum objective (≥ 25 stock-length sunfish/net night; Table 3). Sunfish in Lake Cochrane tend to exhibit consistent recruitment resulting in a population with high relative abundance. Since 2002, the mean frame net CPUE of stock-length sunfish has ranged from a low of 35.1 (2010) to a high of 132.7 (2004; Table 2).

The TL of sunfish captured in the 2012 frame net catch ranged from 8 to 20 cm (3.1 to 7.9 in; Figure 5). The majority of captured sunfish were in the quality-preferred length category, which resulted in a PSD of 94 and PSD-P of 1 (Table 1; Figure 5). The 2012 PSD was above the objective range of 30-60; while the PSD-P was below the objective range of 5-10 (Table 3). Predation from abundant largemouth bass likely

plays an important role in the size structure of the sunfish population in Lake Cochrane. Wilson et al. (2000) reported that slight improvements in bluegill size structure from 1994 to 1999 may be a result of increased predation by an increased density of largemouth bass in Lake Cochrane. Kaufman et al. (2008) reported that the high density largemouth bass population in Lake Cochrane appeared to be improving the sunfish size structure as PSD-P values increased between 2002 and 2006 and exceeded the management objective in 2006 (Table 3; Figure 5). However, fewer preferred-length sunfish have been captured in the frame net catch since 2008 (Table 3; Figure 5).

Otoliths were collected from a sub-sample of sunfish in Lake Cochrane during 2012. Seven year-classes (2002, 2004, 2006-2010) were present in the survey indicating consistent recruitment (Table 5).

Wilson et al. (2000) reported slow growth of Bluegill with fish reaching quality-length (150 mm) at age-7. Growth rates observed in 2012 were faster with a weighted mean TL at capture for age-4 sunfish of 164 mm (6.4 in; Table 6). Sunfish in the 2012 frame net catch from Lake Cochrane had mean Wr values that ranged from 99-106 for all length categories sampled, with the mean Wr of stock-length sunfish being 105 (Table 1). Seasonal influences (i.e., spawning behavior) may have influenced mean Wr values for sunfish in Lake Cochrane. No length-related trends in Wr were observed in 2012.

Walleye: The mean gill net CPUE of stock-length Walleye during 2012 was 1.8 (Table 1) and below the objective range (≥ 10 stock length Walleye/net night) for Lake Cochrane. Since 2002 Walleye relative abundance, as indexed by mean gill net CPUE values, has ranged from a low of 1.8 (2012) to a high of 8.0 (2004; Table 2). The gill net CPUE of stock-length Walleye during 2012 indicated low relative abundance in spite of biennial large fingerling stocking.

Walleye captured in the 2012 gill net catch from Lake Cochrane ranged in TL from 19 to 45 cm (7.5 to 17.7 in), had a PSD of 43 and a PSD-P of 0 (Table 1; Figure 6). The PSD was within the management objective (30-60) and PSD-P was below the management objective (5-10; Table 3).

Otoliths were collected from a sub-sample of gill net captured Walleye in 2012. Two Walleye year-classes (2008, 2010) were represented in the gill net sample (Table 7). Both year classes coincide with large fingerling stockings (Table 7).

Growth rates can be influenced by the length at which large fingerlings are stocked into Lake Cochrane, as the size of stocked fish can vary greatly from year to year. The 2012 weighted mean TL at capture for age-4 walleye was 390 mm (15.4 in.; Table 8). The mean Wr of stock-length Walleye was 90 (Table 1).

Yellow Perch: Yellow Perch in Lake Cochrane have a long history of slow growth, poor size structure, and relatively high abundance of sub-quality length fish (Ermer et al. 2006). The 2012 mean gill net CPUE of stock-length Yellow Perch was 38.5 (Table 1). Since 2002, the mean gill net CPUE of stock-length Yellow Perch has fluctuated with a low of 5.3 (2008) and a high of 130.3 (2002; Table 2). Yellow Perch relative abundance is high.

Yellow Perch in the 2012 gill net catch from Lake Cochrane ranged in TL from 13 to 23 cm (5.1 to 9.1 in), had a PSD of 26 and a PSD-P of 0 (Table 1; Figure 7). Both the PSD and PSD-P were below the management objective ranges of 30-60 and 5-10 (Table 3), indicating a population dominated by smaller individuals.

Otoliths were collected from a sub-sample of Yellow Perch in the 2012 gill net catch. Five consecutive year-classes (2005-2009) were present indicating consistent recruitment. Year classes produced in 2008 and 2009 were the most represented and collectively comprised 78% of Yellow Perch in the sample (Table 10).

Yellow Perch in Lake Cochrane tend to be long-lived with relatively slow growth. The weighted mean TL at capture of age-3 and age-4 male Yellow Perch was 159 and 183 mm (6.3 and 7.2 in.; Table 11). The weighted mean TL at capture of age-3 and age-4 female Yellow Perch was 159 and 198 mm (6.3 and 7.8 in.; Table 11). Mean Wr values for Yellow Perch in the 2012 gill net catch ranged from 97 to 103 for all length categories sampled with the mean Wr of stock-length Yellow Perch being 101 (Table 1). A decreasing trend in Wr was observed as TL increased.

Other Species

Black Bullhead: Two Black Bullhead were captured in the 2012 frame net sample resulting in a mean frame net CPUE for stock-length Black Bullhead of 0.2 (Table 1) and within the objective (≤ 100 stock-length Black Bullhead/net) for Lake Cochrane (Table 3). Apparent low recruitment in recent years has resulted in a declining Black Bullhead population in Lake Cochrane. Black Bullhead relative abundance has declined in each survey conducted from 2002-2010 (Table 2). With a small sample size inferences about population dynamics cannot be made.

Northern Pike: Northern Pike typically are not sampled consistently using standard lake survey methods; however, Northern Pike abundance is believed to be moderate. In 2012, the gill net catch resulted in a mean gill net CPUE of 2.5 (Table 1) and is the highest observed since 2002 (Table 2). Northern Pike ranged in TL from 46 to 60 cm (18.1 to 23.6 in.). Condition was good with a mean Wr for stock-length Northern Pike of 93 (Table 1).

Management Recommendations

1) Conduct fish population assessment surveys utilizing frame nets and gill nets on a biennial basis (next survey scheduled in summer 2014) to monitor fish relative abundance, fish population size structure, fish growth and stocking success.

2) Conduct spring night electrofishing on a biennial basis (in conjunction with netting survey) to monitor Largemouth Bass population parameters.

3) Collect otoliths from sunfish (Bluegill, Green Sunfish, and Bluegill X Green Sunfish hybrids), Walleye and Yellow Perch; scales from Largemouth Bass to assess age structure and growth rates of each population.

4) Stock Walleye at (≈25 large fingerlings/acre) on a biennial basis to establish additional year-classes.

5) Maintain the 356-457 mm (14-18 in) protected slot length limit on Largemouth and Smallmouth Bass. The regulation is designed to increase the average size of black bass while allowing harvest of small bass to avoid slowing of growth (Blackwell and Lucchesi 2009).

6) Partner with willing landowners on shoreline restoration projects designed to restore native plant fauna along highly-developed shorelines providing improvements to water quality and littoral habitats within the lake.

Table 1. Mean catch rate (CPUE; gill/frame nets= catch/net night, electrofishing= catch/hour) of stock-length fish, proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish, and mean relative weight (Wr) of stock-length fish for various fish species captured in frame nets, experimental gill nets, and spring night electrofishing in Lake Cochrane, 2012. Confidence intervals include 80 percent (± CI-80) or 90 percent (± CI-90). BLB= Black Bullhead; BLC= Black Crappie; LMB= Largemouth Bass; NOP= Northern Pike; SUN= sunfish (Bluegill, Green Sunfish, Bluegill X Green Sunfish hybrids); WAE= Walleye; YEP= Yellow Perch

	Abundance		Stock Density Indices				Condition	
Species	CPUE	CI-80	PSD	CI-90	PSD-P	CI-90	Wr	CI-90
Frame nets								
BLB	0.2	0.2	100	0	100	0	95	<1
BLC	1.3	0.4	100	0	0	---	95	1
NOP	0.1	0.1	0	---	0	---	82	---
SUN	67.8	17.0	94	2	1	0	105	1
WAE	0.3	0.2	33	67	33	67	89	2
YEP	0.9	0.7	55	29	0	---	94	7
Gill nets								
BLB	0.3	0.4	100	---	0	---	81	---
BLC	19.0	26.8	64	9	3	3	108	1
LMB	0.8	0.8	0	---	0	---	100	<1
NOP	2.5	2.1	80	24	0	---	93	1
SUN	4.8	5.6	84	15	0	---	108	1
WAE	1.8	0.4	43	39	0	---	90	4
YEP	38.5	15.0	26	6	0	---	101	1
Electrofishing								
LMB [1]	177.0	43.9	43	6	14	4	97	<1

[1] Spring night electrofishing-LMB.

Table 2. Historic mean catch rate (CPUE; gill/frame nets= catch/net night, electrofishing= catch/hour) of stock-length fish for various fish species captured in frame nets, experimental gill nets, and spring night electrofishing in Lake Cochrane, 2002-2012. BLB= black bullhead; BLC= Black Crappie; COC= Common Carp; LMB= Largemouth Bass; NOP= Northern Pike; SHR= Shorthead Redhorse; SUN= sunfish (Bluegill, Green Sunfish, Bluegill X Green Sunfish hybrids); WAE= Walleye; WHS= White Sucker; YEP= Yellow Perch

	CPUE					
Species	2002	2004	2006[1]	2008	2010	2012
Frame nets						
BLB	51.5	30.1	13.8	6.4	3.5	0.2
BLC	3.9	8.2	3.6	1.3	0.1	1.3
LMB	0.0	0.3	0.2	0.1	0.1	0.0
NOP	0.0	0.1	0.0	0.1	0.1	0.1
SUN	49.8	132.7	55.1	38.8	35.1	67.8
WAE	0.3	0.7	0.2	0.2	0.2	0.3
YEP	4.9	4.9	9.7	12.5	2.2	0.9
Gill nets						
BLB	8.3	2.8	2.0	0.8	0.8	0.3
BLC	0.5	2.5	0.3	0.3	1.0	19.0
COC	0.0	0.0	0.0	0.0	0.3	0.0
LMB	0.0	3.3	1.2	0.8	0.8	0.8
NOP	0.7	0.2	0.8	0.8	0.8	2.5
SHR	0.0	0.2	0.0	0.0	0.0	0.0
SUN	3.6	3.5	4.8	1.0	3.5	4.8
WAE	4.7	8.0	6.7	4.3	7.3	1.8
WHS	0.0	0.0	0.2	0.0	0.0	0.0
YEP	130.3	67.2	69.7	5.3	54.3	38.5
Electrofishing						
LMB [2]	---	128.4	148.0	100.0	123.0	177.0

[1]Monofilament gill net mesh size change (0.75", 1.00", 1.25", 1.50", 2.00" and 2.50")
[2] Spring night electrofishing.

Table 3. Mean catch rate (CPUE; gill/frame nets= catch/net night, electrofishing= catch/hour), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish, and relative weight (Wr) for selected species captured in frame nets, experimental gill nets, and electrofishing in Lake Cochrane, 2002-2012. BLB= Black Bullhead; BLC= Black Crappie; LMB= Largemouth Bass; SUN= sunfish (Bluegill, Green Sunfish, Bluegill X Green Sunfish hybrid); WAE= Walleye; YEP= Yellow Perch

Species	2002	2004	2006[1]	2008	2010	2012	Objective
Frame nets							
BLB							
CPUE	52	30	14	6	4	<1	≤ 100
PSD	100	100	97	99	100	100	---
PSD-P	28	54	96	75	97	100	---
Wr	88	89	100	99	97	95	---
BLC							
CPUE	4	8	4	1	<1	1	≥ 10
PSD	77	45	51	43	0	100	30-60
PSD-P	10	14	11	9	0	0	5-10
Wr	88	95	97	95	102	95	---
SUN							
CPUE	50	133	55	39	35	68	≥ 25
PSD	86	91	77	79	53	94	30-60
PSD-P	1	3	11	2	4	1	5-10
Wr	---	---	108	108	107	105	
Gill nets							
WAE							
CPUE	5	8	7	4	7	2	≥ 10
PSD	64	13	15	18	45	43	30-60
PSD-P	54	10	5	6	3	0	5-10
Wr	87	78	89	87	90	90	---
YEP							
CPUE	130	67	70	5	54	39	≥ 30
PSD	31	51	59	29	38	26	30-60
PSD-P	0	0	3	0	0	0	5-10
Wr	92	89	98	90	93	101	---
Electrofishing							
LMB [2]							
CPUE	---	128	148	100	123	177	≥ 50
PSD	---	26	17	48	24	43	20-40
PSD-P	---	1	1	5	5	14	0-10
Wr	---	85	98	99	96	97	---

[1] Monofilament gill net mesh size change (0.75”, 1.00”, 1.25”, 1.50”, 2.00” and 2.50”)

[2] Spring night electrofishing-LMB.

Table 4. Mean back-calculated length (mm) at age and standard error (SE) for Largemouth Bass captured during spring night electrofishing from Lake Cochrane, 2012.

			Age										
Year	Age	N	1	2	3	4	5	6	7	8	9	10	11
2009	3	3	90	173	211								
2008	4	70	86	143	184	214							
2007	5	16	88	152	211	255	279						
2006	6	22	94	152	193	237	275	299					
2005	7	30	89	154	197	253	291	317	336				
2004	8	21	83	153	202	258	292	322	341	358			
2003	9	12	81	167	219	271	310	348	375	396	413		
2002	10	3	75	179	252	309	344	380	403	424	439	459	
2001	11	2	74	169	211	249	290	328	359	377	395	408	422
Mean		179	84	160	209	256	297	332	363	389	416	434	422
SE			2	4	7	10	9	12	12	14	13	26	0
Mean Comparison [1]													
Small lakes/impoundments			99	183	246	299	332	---	---	---	---	---	---
Large lakes/impoundments			89	178	256	316	359	---	---	---	---	---	---
Region IV			80	180	266	325	356	---	---	---	---	---	---
Statewide			96	182	250	305	342	---	---	---	---	---	---

[1] Willis et al. 2001.

Table 5. Year class distribution based on the expanded age/length summary for sunfish (Bluegill, Green Sunfish, Bluegill X Green Sunfish hybrid) sampled in frame nets from Lake Cochrane, 2010-2012.

	Year Class												
Survey Year	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000
2012			9	6	193	460	140		4		2		
2010	---	---				44	117	345	71	27	2	1	2

Table 6. Weighted mean TL (mm) at capture for sunfish (Bluegill, Green Sunfish, Bluegill X Green Sunfish hybrid) age-2 through age-10 sampled in frame nets (expanded sample size) from Lake Cochrane, 2010-12.

	Age								
Year	2	3	4	5	6	7	8	9	10
2012	86(9)	98(6)	164(193)	167(460)	178(140)	---	204(4)	---	204(2)
2010	---	110(44)	130(117)	159(345)	182(71)	199(27)	211(2)	238(1)	212(2)

Table 7. Year class distribution based on the expanded age/length summary for Walleye sampled in gill nets and associated stocking history (# stocked x 1,000) from Lake Cochrane, 2008-2012.

	Year Class											
Survey Year	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
2012			3		6							
2010	---	---			10			16				3
2008	---	---	---	---				13	1	1	3	1
# stocked												
fry												
sm. fingerling												
lg. fingerling	4		3		7			16			5	

Table 8. Weighted mean TL at capture (mm) for Walleye age-1 through age-10 sampled in experimental gill nets (expanded sample size) from Lake Cochrane, 2006-2012. Note: sampling was conducted at approximately the same time during each year allowing comparisons among years to monitor growth trends.

	Age									
Year	1	2	3	4	5	6	7	8	9	10
2012	---	226(3)	---	390(6)	---	---	---	---	---	---
2010	---	274(10)	---	---	405(16)	---	---	---	526(3)	---
2008	---	---	284(13)	304(1)	255(1)	443(3)	400(1)	---	---	---
2006	245(1)	---	314(1)	348(29)	351(8)	432(1)	---	---	---	579(1)

Table 9. Stocking history including size and number for fishes stocked into Lake Cochrane, 2001-2012. WAE=Walleye

Year	Species	Size	Number
2002	WAE	large fingerling	4,509
2005	WAE	large fingerling	16,000
2008	WAE	large fingerling	7,068
2010	WAE	large fingerling	3,176
2012	WAE	large fingerling	3,725

Table 10. Year class distribution based on the age/length summary for Yellow Perch sampled in gill nets from Lake Cochrane, 2010-2012.

	Year Class											
Survey Year	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
2012				56	65	24	7	4				
2010	---	---		13	74	71	11	65	8	2		2

Table 11. Weighted mean TL (mm) at capture by gender for Yellow Perch captured in experimental gill nets (expanded sample size) from Lake Cochrane, 2010-2012.

	Age								
Year	1	2	3	4	5	6	7	8	9
2012									
Male	---	---	159(19)	183(17)	188(10)	203(3)	---	---	---
Female	---	---	159(35)	198(53)	200(9)	233(2)	202(5)	---	---
Combined	---	---	161(56)	193(65)	192(24)	212(7)	205(4)	---	---
2010									
Male	101(7)	142(35)	164(33)	187(4)	215(24)	225(4)	---	---	223(2)
Female	95(7)	157(39)	184(38)	204(6)	226(44)	---	242(2)	---	---
Combined	98(13)	149(74)	173(71)	197(11)	221(65)	228(8)	242(2)	---	223(2)

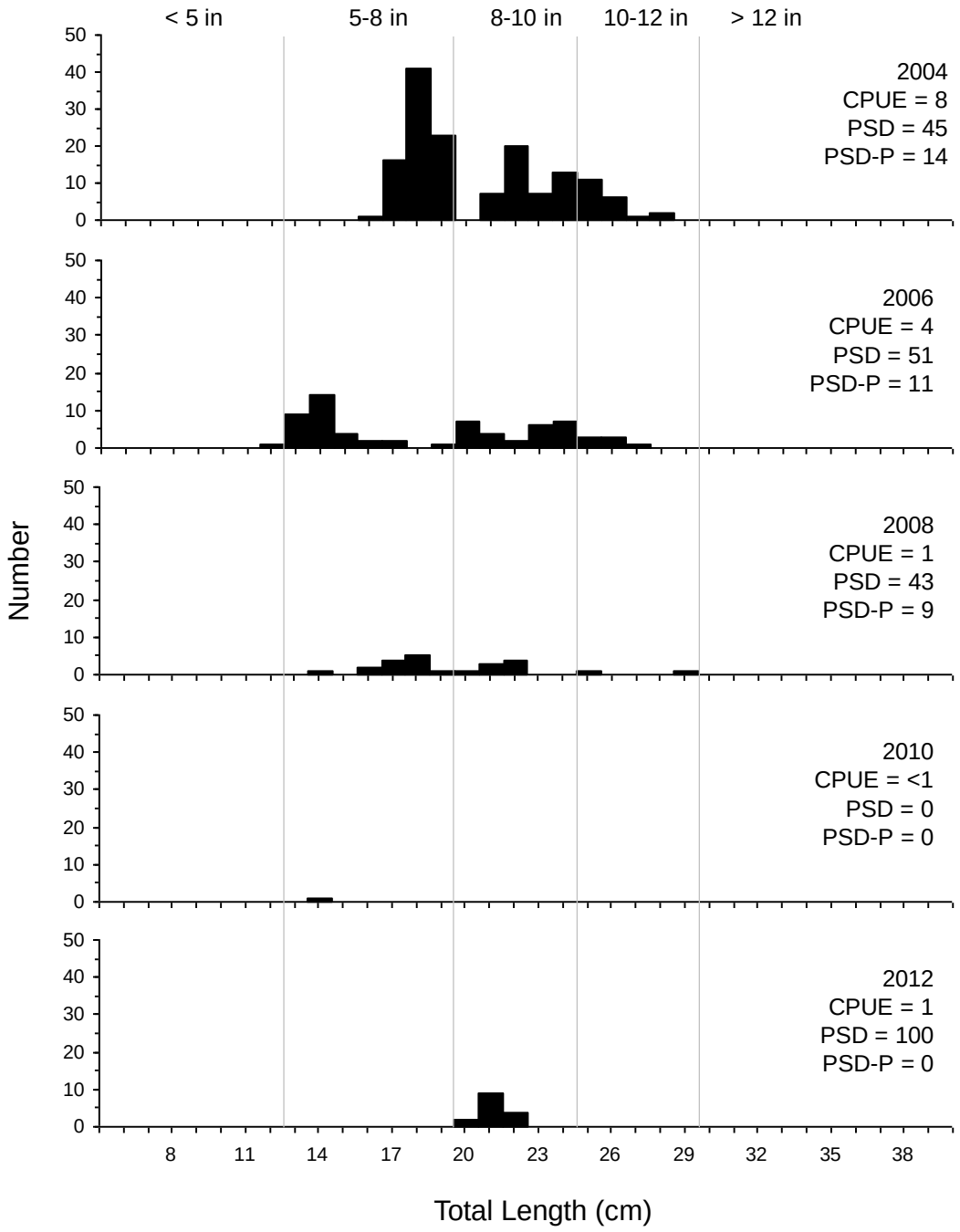

Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish Black Crappie captured using frame nets in Lake Cochrane, 2002-2010.

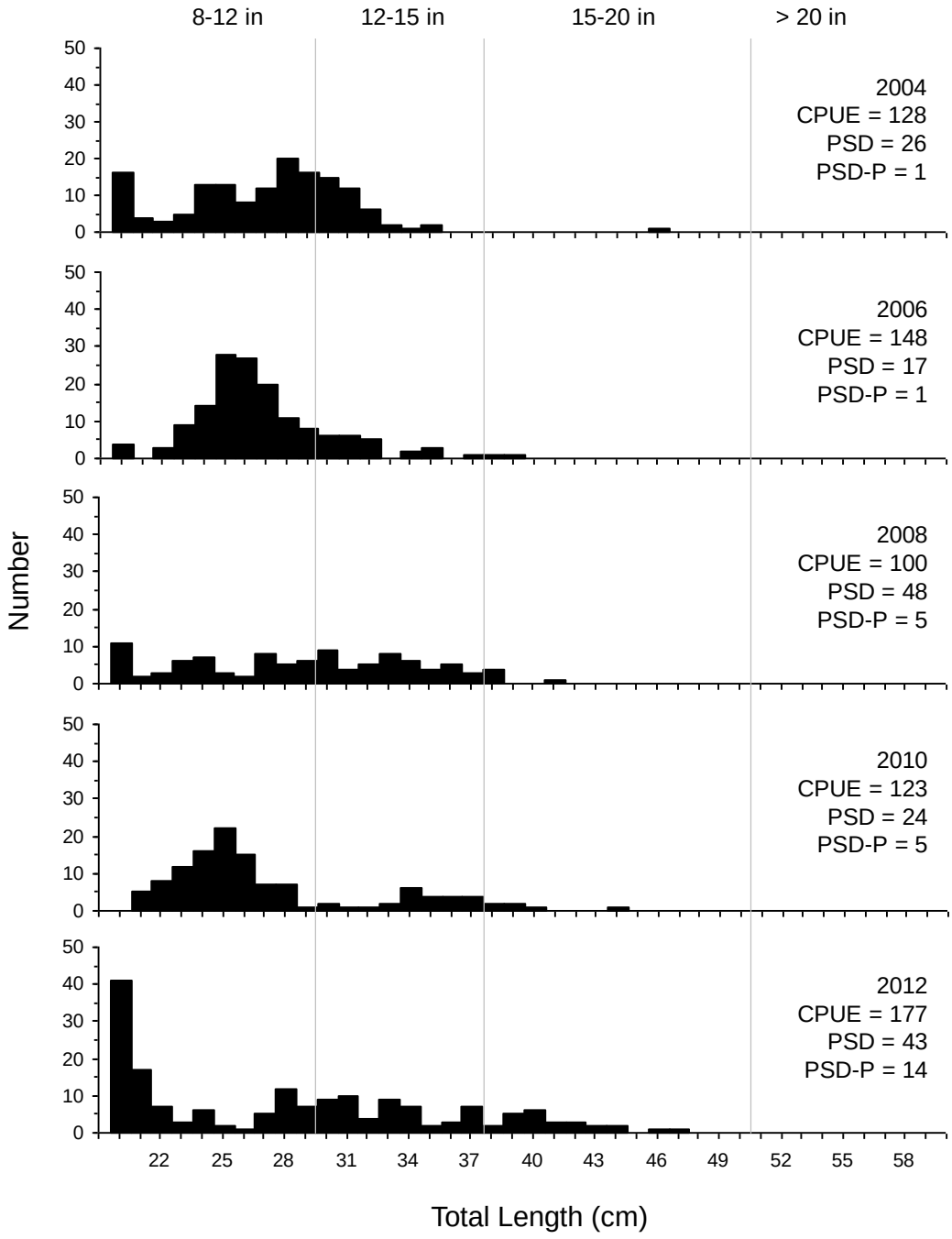

Figure 4. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish Largemouth Bass captured during spring night electrofishing from Lake Cochrane, 2004-2012.

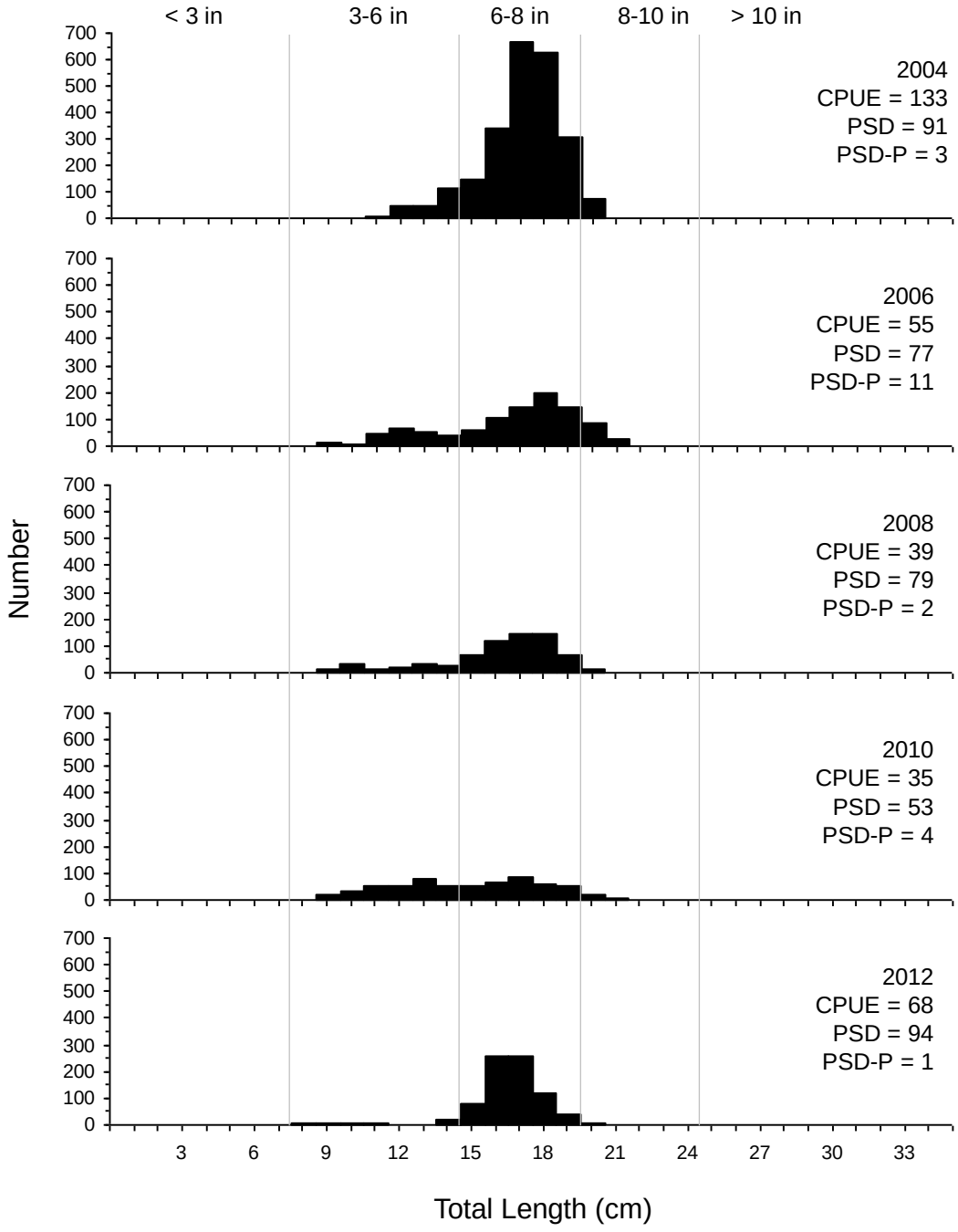

Figure 5. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish sunfish (Bluegill, Green Sunfish, Bluegill X Green Sunfish hybrid) captured using frame nets in Lake Cochrane, 2004-2012.

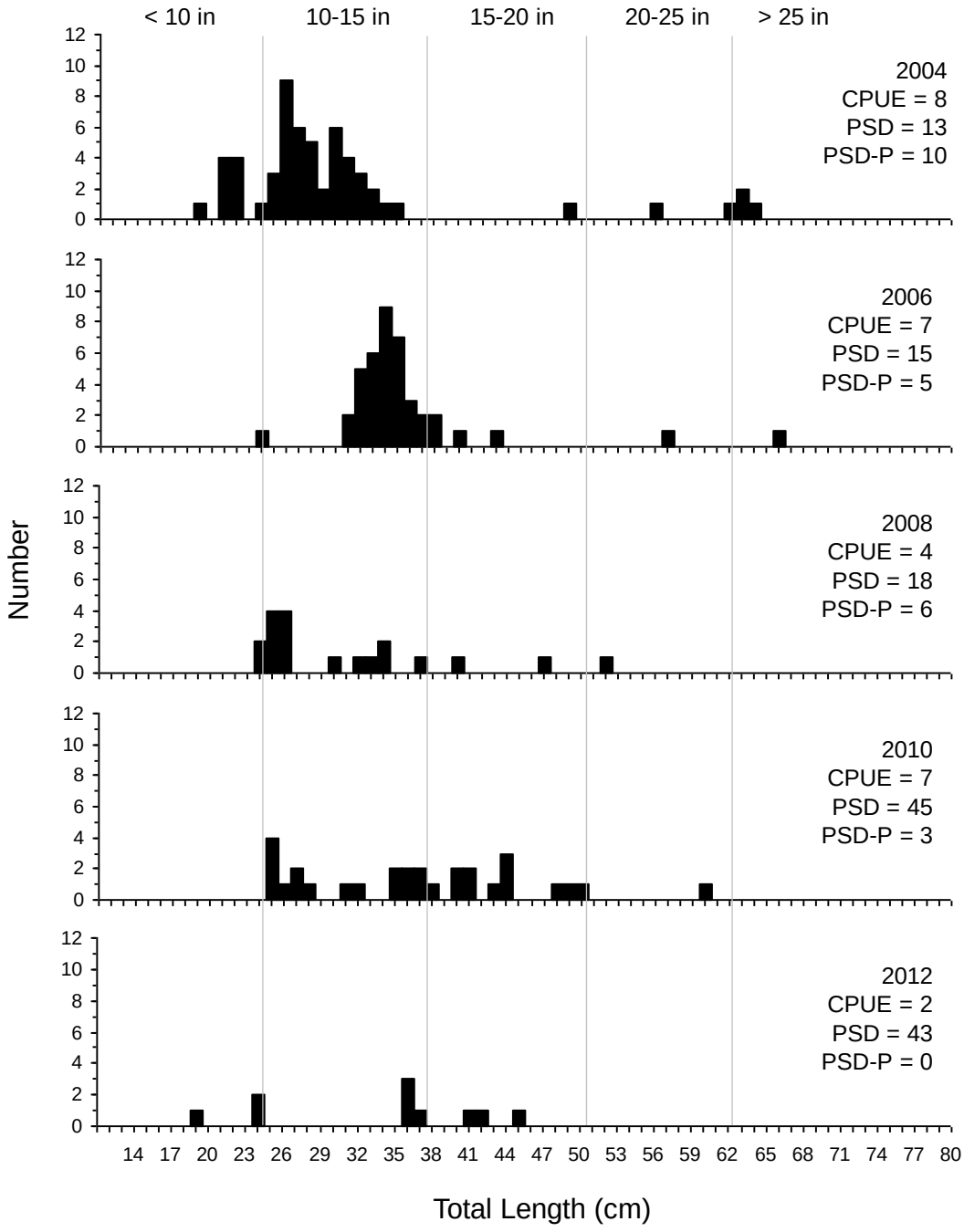

Figure 6. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish Walleye captured using gill nets in Lake Cochrane, 2004-2012.

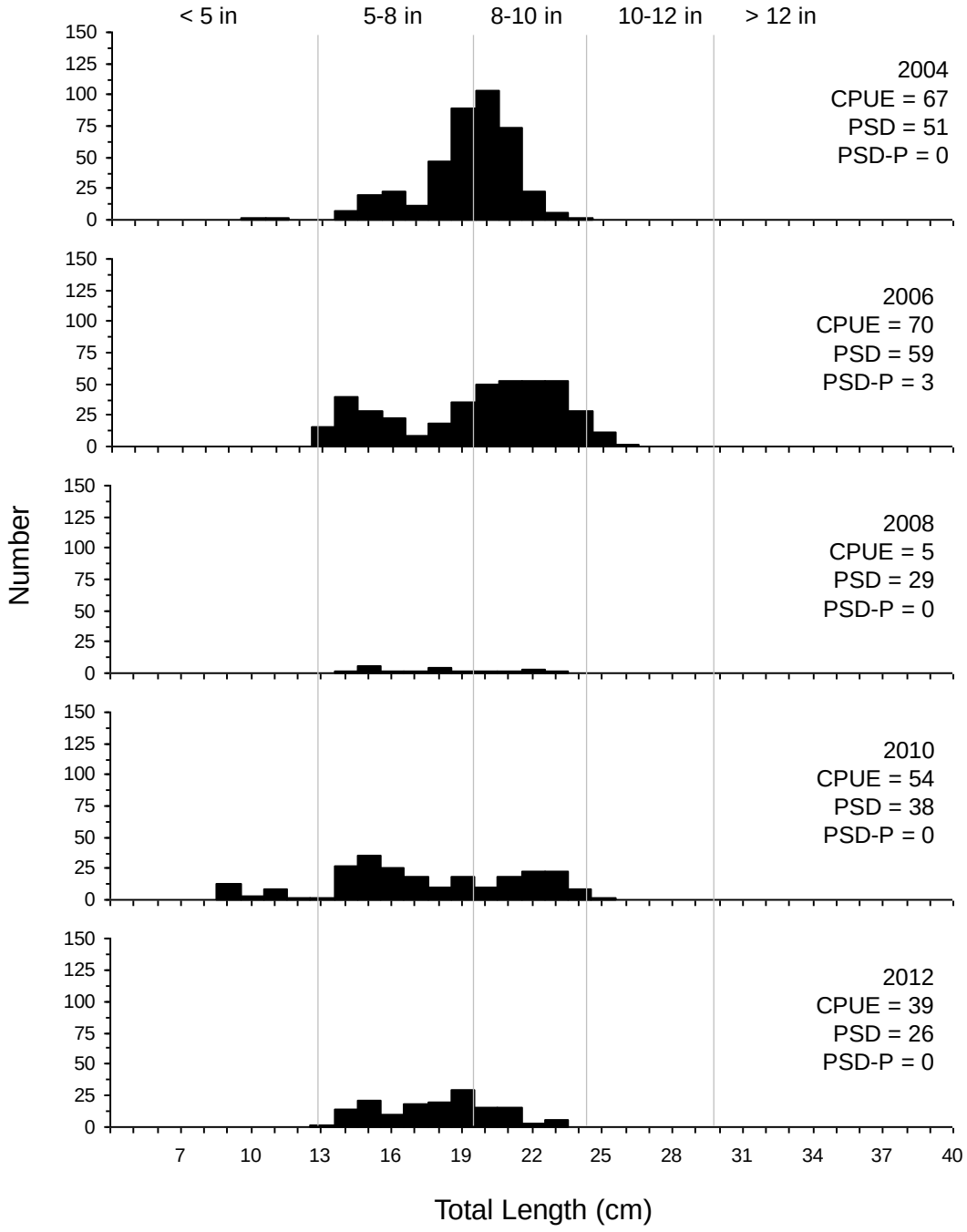

Figure 7. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish Yellow Perch captured using gill nets in Lake Cochrane, 2004-2012.

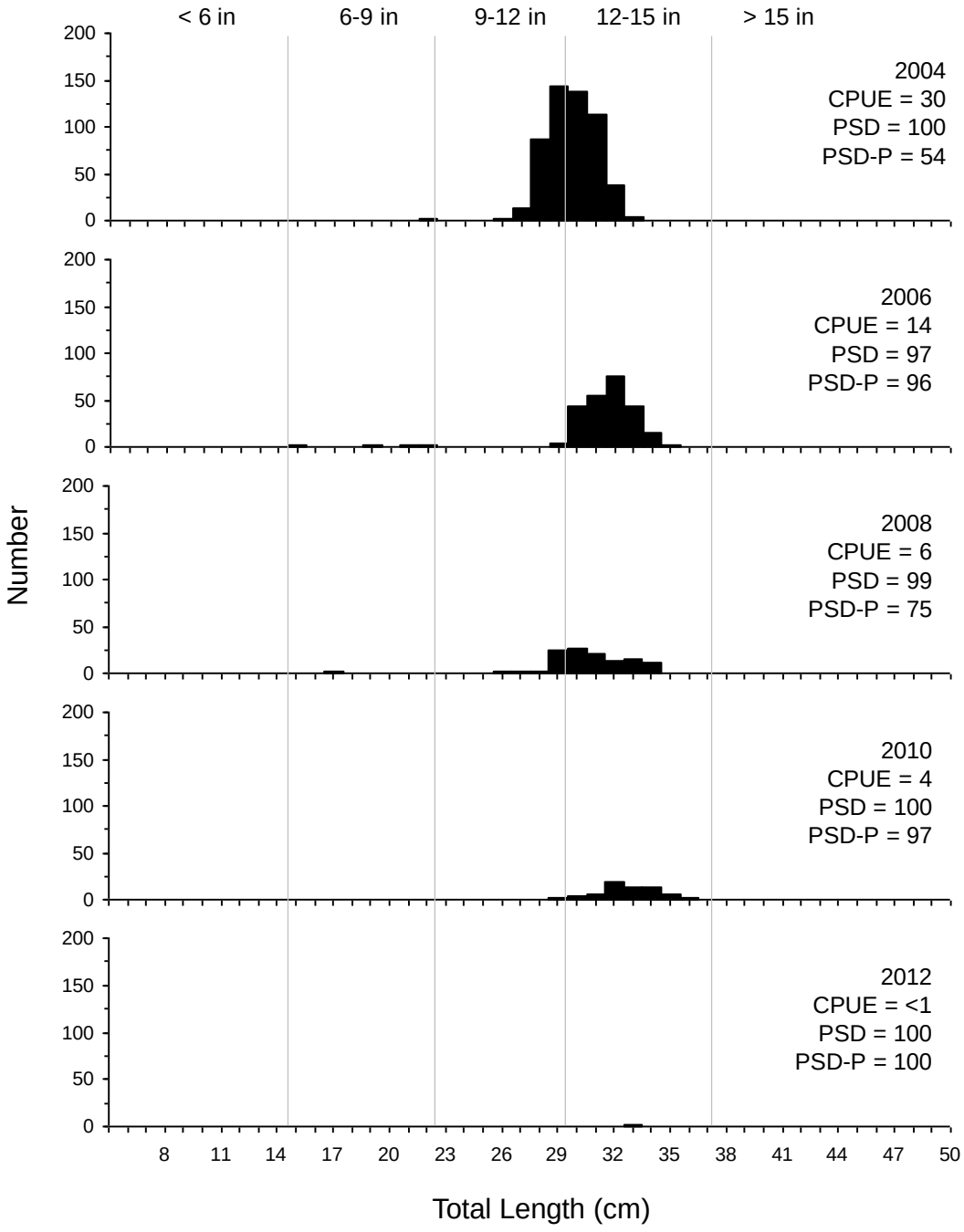

Figure 8. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish Black Bullhead captured using frame nets in Lake Cochrane, 2004-2012.